50 Years of The Cooperative Dry Bean Nursery

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History

There is no record of the occurrence of wild populations of common bean (*Phaseolus vulgaris* L.) north of the state of Chihuahua, Mexico. But domesticated dry bean of pinto and red Mexican types, among others, have been grown in the United States by native Indians for thousands of years. During the long process of domestication and until the later part of the nineteenth and early part of the twentieth century, new cultivars were selected from preexisting landraces that possessed variability principally originating from sports or mutations and chance hybrids. For example, from selections within commercial cultivars, F. A. Spragg, the first full time bean breeder at the Michigan Agricultural College, released in 1915 a bean common mosaic resistant dry bean cultivar 'Robust'. Similarly, C.W. Hungerford, the founder of bean improvement program at the University of Idaho when Purnell funds first became available in 1925, selected and released great northern cultivars 'UI 1' in 1930 and 'UI 59', 'UI 81', and 'UI 123' in 1932 from the most popular Great Northern then grown in southern Idaho. The latter three were immune to bean common mosaic in their time, and now we know that they also possess tolerance to common bacterial blight.

A. N. Jones of Leroy, NY, is credited with developing the first garden bean cultivars from hybridization beginning in 1881 with the release of 'Jones Ivory Pod Wax'. Probably the first dry bean cultivars developed from hybridization and released in 1938, were white navy 'Michelite' in Michigan and red Mexican 'UI 3' and 'UI 34' in Idaho. In any case, the promising off types or rogues and cultivars derived from hybridization were selected based on very limited tests in local environments. This continued until 1950 for public institutions that evaluated promising lines originating from their breeding programs within their state boundaries.

The Cooperative Dry Bean Nursery

The Cooperative Uniform Dry Bean Nursery (CDBN) was initiated in February 1950. The name "Uniform" was dropped in 1953. The USDA and seven states, namely, CO, MT, ID, NE, NM, WA, and WY participated in the first CDBN. CO, NE, and USDA each contributed one entry. MT contributed two, NM three, and ID eight entries. There were one red Mexican, two small white, five great northern and eight pinto cultivars. Only Idaho contributed entries for the four market classes. The first CDBN was grown at 10 locations and evaluated for 18 characters by M. Afanasiev, D. Burke, W. Clore, D. LeBaron, J. Meiners, H. Morris, L. Paules, S. Paul, F. Pumphrey, M. Schuster, G. Starr, H. Thomas, W. Thomas, H. Walters, and W. Zaumeyer. The nursery was organized and distributed by the USDA from 1950 to 1962. The University of Idaho has been organizing and distributing the CDBN since 1963.

More recent participants include KN (1962), TX (1964), MN (1965), NY (1973), AZ and ND (1976), Alberta (1978), CA and MI (1981), Ontario (1984), Saskatchewan (1986), MO (1989), and Manitoba (1998).

The 50th CDBN distributed in 1999 consisted of 36 entries contributed by 12 private and public institutions in the US and Canada. It represented nine market classes of dry beans: black, great northern, dark and light red kidney, navy, pink, pinto, red Mexican, and white kidney. It was tested at 19 locations in Alberta, AZ, CO, ID, Manitoba, MI, MO, MT, ND, NE, NM, NY, Ontario, Saskatchewan, WA, and WY.

CDBN Limitations

As the number of participants increased, seed requirement for each test entry also increased. For example, for the 1999 CDBN, 50, 65, and 75 lbs of seed for each small-, medium-, and large-seeded entry, respectively, were required. Probably as a consequence fewer institutions contribute entries and participation of private breeders continues to be minimal. This over the years might have somewhat discouraged both public and private breeders from submitting new entries until a larger quantity of seed was available and/or they were formally released as new cultivars. As an alternative, private breeders developed their own testing systems and began to submit entries directly to state performance trials in their target areas. The Midwestern Regional Nursery, organized and distributed by Kenneth Grafton (NDSU-Fargo), was borne with participation of public breeders from CO, MI, and NE. Continual distribution of the nursery to non-entry contributing states and cooperators in marginal bean growing environments has accentuated problems of larger seed demand. Moreover, evaluation of only a partial set, not returning data, delayed test entry submission, and inadequate data recording have posed serious problems and contributed to the reduced utility of CDBN. This warranted a review of the CDBN.

Results of the 1999 Survey

A questionnaire was distributed in February-March 1999. Of 19 actively participating respondents from 110 recipients of the questionnaires, the following conclusions were drawn. There was unanimous support for the University of Idaho to continue coordination of the CDBN. There should be no more than 50 entries and four replicates in the CDBN. A plot size of four rows, each 16 to 22 ft long and a randomized complete block design were preferred. Essential traits suggested to be recorded were growth habit, days to flower and maturity, seed yield, 100-seed weight, and reaction to important diseases including anthracnose, bean common mosaic, common bacterial blight, rust, root rots, curly top, and white mold. Thus, given the above limitations of the CDBN and survey results it is a daunting challenge as to how to maximize participation and utility of the CDBN to its entry contributing institutions. Consequently the above issues were extensively discussed during the W-150 meetings in Mayaguez (Puerto Rico) and in the Bean Improvement Cooperative meetings at Calgary (Alberta) in 1999.

Formation of the CDBN Coordinating Committee

A Coordinating Committee comprising five members, with the University of Idaho representative (S. Singh) as chair was formed in January 2000. The other four members of the committee are. Kenneth Grafton (NDSU-Fargo), David Nuland (UN-Scottsbluff), Bert Vandenberg (Univ. of Saskatchewan-Saskatoon), and David Webster (Seminis Vegetable Seeds, Inc., Filer). The first task of the committee was to formulate a set of guidelines for the CDBN 2000 and beyond. These are (1) only a minimal quantity of seed will be distributed to each participant, (2) only entry-contributing and/or data -returning participants will receive CDBN, (3) there will be no distribution of partial sets of CDBN entries, (4) when seed is limiting, only a small quantity of seed for an observation nursery will be distributed to non-entry contributing but data-returning recipients, (5) more complete and uniform evaluations for important diseases, abiotic stresses, seed quality characters including after-darkening, commercial acceptability, cooking, canning, and processing qualities must be sought in addition to yield, seed weight, maturity, plant type, and lodging, (6) each new entry may be tested for no more than three years, (7) there will be at least one check for each market class of bean included in nursery, (8) each participant will submit electronically up to two-pages camera-ready report of analyzed and summarized data using the CDBN template with a brief description of the trial and interpretation of results, and (9) the deadlines for: (a) entry submission is February 28, (b) distribution of CDBN is April 1, (c) data returning is November 15, (d) preliminary report is December 15, and (e) the final report is February 28. Please contact any of the CDBN Coordinating Committee Members for additional information or clarification.